STRAIGHTENING STREAM CHANNEL APPROACHES TO DRAINAGE STRUCTURES

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There are three reasons for changing stream channels: namely, protection of drainage structures, protection of highways, and flood control.

These control measures have been practiced for many years in Fayette County, under the supervision of several different individuals, but with the same equipment and experienced excavating contractor. Therefore, methods of procedure have become standard and results obtained are permanent in so far as man is able to control flowing water. Of course the behavior of streams in different locations varies, but the same principles of control apply.

The new channel should be kept as straight as possible. All curves should be eliminated. The inlet should be made lower than the old channel. A dam is not always necessary to divert the flow of water to the new channel, but where required, should be situated considerably downstream in the old channel. The "dead water" thus impounded prevents erosion and subsequent destruction of any breaker constructed. It must be higher than surrounding land to prevent overflow during high water. The whole secret in the success of controlling flow through the new channel lies in completely preventing any return of flowing water to the old channel.

The size of the new channel is determined by the size of the old channel. To keep down earth-moving costs, an estimate is made of normal flood requirements, then the channel is constructed somewhat smaller. A subsequent flood will soon widen any channel of insufficient width. The slope of banks is usually 1 to 1.

A dragline of one and one-quarter yeards capacity, equipped with a fifty-foot boom has been rented by the hour for this type of work. This same machine is used on new road construction. Frequently, channel change and new road construction supplement each other. During the construction season the dredge is usually routed around the county on the most economical route. Other work is planned to suit its movements. If the distance is short the machine goes under its own power; otherwise a trailer is required.

Experience has shown that auxiliary equipment such as a small, crawler-type tractor and small grader, is an efficient aid in berm leveling and in other finishing work. This is especially true in operating through tillable land. In cleaning deposits from under bridges the tractor is used to pull the bucket under the bridge.

When necessary to move earth for hauls up to 1,500 feet, five 2½-cubic-yard-capacity dump trucks are used. One mar

Fig. 1. Illustrating FERA handwork in correcting drainage channel approach to a small, concrete arch highway bridge.

is required on the dump to aid in building the grade, or dam, and to trip the end gates.

The cost of labor is what you care to make it. The cost of other equipment varies for the type of operation. We have moved earth for six cents per cubic yard. Much gravel has been loaded at fifteen cents per cubic yard.

Our arrangements with landowners vary. Seldom do we pay damages. Actual benefits often result to the land owner and the privilege of ingress and egress is readily granted.

Fig. 2. New channel approaching concrete highway bridge at right angles. Old channel followed along line of trees meeting the road about 500 feet to the left, then paralleling the road to a right angle discharge through the bridge. Flood waters had seriously damaged the road embankment and threatened the stability of the bridge.

In some cases we have been compensated by the land owner with timber, borrow-pit, or gravel concessions.

This kind of work raises many other problems such as making detours around weak bridges, moving utility lines, and relocating underground drains. The public is pleased by the elimination of detours, whenever possible.

Since the Civil Works Administration and Emergency Relief Administration forces have been available, much hand labor has been used on channel change jobs. (Fig. 1.) Experience thus gained shows this type of "made work" is worth while. Channel changes can be accomplished through woodland near and under bridges, or in other cramped quarters where machines cannot work. In most other cases, however, this method is not economical. The channels thus made are much narrower and result in delta deposits elsewhere that tend to cause trouble.

The practice of relocation of streams often prevents damage to expensive drainage structures or their complete destruction. (Fig. 2.) It may cover the cost of new drainage structures. It may aid in securing proper alignment for new highways.